EQUINE VIRAL ARTERITIS

A disease to be managed!

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Equine Viral Arteritis

EVA often results in:

- Misunderstanding!
- Misinformation!
- Panic!

There is really no need for any of these!
Equine Viral Arteritis

The first things to do when you hear about EVA are:

• Not panic!
• Learn all you can from reputable sources;
• Remember that “proactive” is far better than “reactive”!
Equine Viral Arteritis

EVA is not a new disease!

- It was first identified in 1953
- It is believed that cases were seen before that, but not differentiated from other diseases.
- It is hypothesized that it may be 100 or more years old!
Equine Viral Arteritis

EVA is primarily a respiratory disease, but has some significant reproductive implications.

Infected stallions may harbour the virus permanently;

Mares infected during pregnancy have a high risk of abortion;

While it is rarely fatal – other than abortions – neonates and debilitated animals may succumb.
Equine Viral Arteritis - Definitions

“EVA” refers to the disease – Equine Viral Arteritis

“EAV” refers to the virus – Equine Arteritis Virus

The EAV is of the genus Arterivirus. Arteriviridae are medium-sized, enveloped, positive-sense, single-stranded RNA viruses, with an icosahedral nucleocapsid. Other viruses in the family include porcine respiratory and reproduction syndrome virus (PRRSV), lactate dehydrogenase elevating virus (LDV) of mice and simian haemorrhagic fever virus (SHFV) of monkeys.
Equine Viral Arteritis - Symptoms

Depression:
Equine Viral Arteritis - Symptoms

Edema – Lower limb:
Equine Viral Arteritis - Symptoms

Edema – Mammary glands:
Equine Viral Arteritis - Symptoms

Edema – Sheath & scrotum:
Equine Viral Arteritis - Symptoms

Conjunctivitis ("Pink-eye") and Supraorbital or periorbital edema:
Equine Viral Arteritis - Symptoms

Epiphora
(“Tearing”):
Equine Viral Arteritis - Symptoms

Urticaria
(“Nettle rash”):
Equine Viral Arteritis - Symptoms

Less commonly seen symptoms may include:

- Adventitious edematous swellings in the intermandibular space, beneath the sternum, the shoulder region or other parts of the body;
- Respiratory distress, including polypnea and dyspnea, especially in young foals;
- Coughing,
- Diarrhea;
- Posterior paresis and ataxia;
- Submaxillary lymphadenopathy;
- Papular eruptions on the mucous membrane inside the upper lip; these are usually found in association with a skin rash;
- Gingival and buccal erosions.
Equine Viral Arteritis - Symptoms

Or the most common and possibly most alarming of all:

ASYMPTOMATIC
EVA – Transmission

Transmission of the virus is commonly achieved with aerosol droplet transfer of mucus membrane discharge.

Transmission also results from transfer of the virus in the semen of “shedding” stallions.
EVA – Transmission

As the disease is caused by a virus, it cannot be controlled with antibiotics as a bacterium can.

This means that breeding by live cover or AI will not prevent the transfer of the virus from a “shedding” stallion, even if antibiotics or an antibiotic semen extender are used.

The virus cannot be destroyed by freezing either, so the use of frozen semen from a “shedder” stallion will also transfer the virus.
EVA – Transmission - acute

All sexes of horses can transmit the virus while in the acute stages of the disease.

This infectious stage lasts about 21-28 days.

Donkey and mules may also be infectious, and intact males may harbour and shed the virus in their semen.
The stallion is the major natural reservoir for EAV. EAV is the only identified testosterone-dependent virus for long-term harbouring and therefore shedding. No testosterone = no harbouring! Hence – mares cannot permanently harbour and shed the virus!

If all stallions were vaccinated before becoming infected, and boostered annually, the disease could be eradicated!
EVA – Stallions

A stallion that becomes infected with the EAV may become a permanent “shedder” of the virus in his semen; Up to 70% of infected stallions may become “shedders”; “Shedding” may spontaneously cease, and will not be intermittent. Breed incidence rate varies tremendously, and is influenced primarily by exposure rates.
EVA – Stallions

Although stallions infected with EAV may become permanent shedders of the virus in their semen, it will not be shed in urine or respiratory secretions after the acute stage has passed (~21 days). Except for possible lowered fertility for up to 16-17 weeks following infection (probably as a result of increased testicular temperature during the acute stages), there is no negative impact on fertility. Some States now require importation permits showing EVA status of the stallion to accompany semen shipments.
EVA – Mares

Mares cannot harbour and/or shed the virus on a permanent basis, but mucous membrane secretions can cause transmission during acute infection. Mares bred to EAV-positive stallions will be likely to become infected and infectious themselves, but are unlikely to lose the pregnancy as a result. Pregnant mares becoming infected after 60-90 days of pregnancy will be likely to lose the pregnancy in the next 21-28 days after infection, not later in pregnancy as with other diseases such as EHV-1.
EVA – Neonates

Neonates from mares infected within the last 3 weeks of pregnancy may succumb to a fulminating interstitial pneumonia within 48 to 96 hours of birth.

Deaths have also been reported in foals a few weeks to months of age that develop a rapidly progressive pneumo-enteritis.
EVA – Anatomy of an Outbreak

- The index farm in NM runs 60-day pregnancy checks on mares checked in foal at 30 days, and only 50% are still pregnant. EHV-1 is suspected, but EVA is identified. Semen shipping is suspended.
- Two on-farm stallions are checked and found to be seropositive and shedding.
- Associated EVA cases are confirmed in 6 States – NM, UT, MT, KS, OK, AL.
- Circumstantial evidence suggests associated EVA cases in 4 more States – CA, ID, CO, TX.
- 9 more States having contact with the index farm are cleared with no outbreaks – WY, SD, MN, MO, IN, KY, MS, LA, FL.
- The true extent of the outbreak is difficult to gauge as Federal and State reporting requirements for EVA are inadequate.
EVA – Anatomy of an Outbreak

- Pink: Diagnostically confirmed outbreaks of EVA.
- Green: Circumstantial evidence of EAV infection (high titers & linked epidem.).
- White: No evidence of EAV infection.
EVA – Anatomy of an Outbreak

A total of 69 direct exposures were identified:

- 48 (69.5%) were mares inseminated with shipped semen.
- 20 (29%) involved mares & foals that had visited the index premises.
- 1 (1.5%) was a mare that was both inseminated & also visited the index premises.

(Direct exposure = horse potentially exposed to infection on index premises (NM) or through insemination with infective semen).

New Mexico and Utah were the most affected States:

- A total of 50 facilities involving 2022 horses were placed under supervised or voluntary quarantine in those two States alone.
EVA – Vaccination

Two vaccines are available; one - a modified live virus “Arvac®” - is available in the USA. The second, “Artervac®”, is an inactivated adjuvanated vaccine used in much of Europe.

Vaccination philosophies vary from State to State and country to country.

There is little doubt that a comprehensive vaccination program will protect all breeders. Vaccination of all colts between 180-270 days would significantly reduce occurrence.
EVA – Vaccination

Issues related to vaccination
There are a handful of countries that will not permit seropositive animals or semen from them into the country. These countries are few and typically not an issue for most breeders.
Most developed breeding countries (e.g. EU, Australia, NZ, Japan) will permit both seropositive animals and semen from them if (in the case of stallions) they are semen-negative.
The USA is the only major horse-producing country that has no EVA importation restrictions or regulations!
EVA – Vaccination Protocols

Mares

• Ask about the EVA status of the stallion being used!

• If the status is unknown or “shedding” vaccinate the mare prior to breeding, and/or quarantine after breeding - Vaccination is the preferable of the two options.

• Mares should be non-pregnant and quarantined for 21 days after vaccination. A single vaccination of “Arvac®” (USA) is required; or 2 doses of “Artervac®” (Europe).

• Vaccination of pregnant mares in the face of an outbreak should be considered.

• Once vaccinated, booster or check titers annually – no quarantine is required. Artervac® requires boosters at 6 months.
EVA – Vaccination Protocols

Stallions

• Remember to consider importation restrictions prior to vaccination.
• Draw 2-3 blood (serum) samples and send one to a USDA or OIE certified lab for evaluation.
• The remaining sample(s) should be kept by your vet in case of loss of the first sample in transit.
• Vaccinate immediately following blood draw.
• Quarantine for 28 days after vaccination.
• Once vaccinated, booster or check titers annually – no quarantine is required.
Geldings

Geldings are somewhat of a non-issue, as they cannot harbour and shed the virus as a stallion can, and will only be infectious during the acute stages of the disease and during early recovery period.

As long as they have no contact with susceptible animals during that time, infection is not an issue.

There may however be situations where vaccination could be desired. Blood-draw is not necessary.
Breeding to or with an EAV-positive and shedding stallion is not an issue, as long as correct protocols are followed:

- The mare should be vaccinated at least 21 days prior to breeding and quarantined for those 21 days, then quarantined again after breeding for an additional 21 days.
- “Quarantine” is not particularly arduous, and is in essence an avoidance of any possible aerosol contact with susceptible animals.
- Ethical EAV-positive stallion owners will ensure that the breeding public is aware of the condition, and that unvaccinated mares are not bred.
- Consider frozen semen from Europe to be “positive” despite being allegedly “negative” – there have been errors in testing.
EVA – Common Myths

Geldings and mares can permanently carry and shed the virus.

False - The virus is testosterone-dependent for harbouring. **EVA can be cured.**

False – while some research has been conducted and shown EAV clearance in some GnRH-suppressed stallions, not all stallions were cleared. NZ now requires an absence of any signs of such treatment prior to approval for import.

Carrier stallions are contagious through non-sexual contact.

False – only secretions from the secondary sex glands will have EAV presence.
EVA – Common Myths

Post-vaccination quarantine is difficult and requires complete isolation, Tyvek® suits etc.
False – Prevention of aerosol transfer (no contact) is adequate.

Once vaccinated a stallion is adequately protected forever.
False – as with any vaccination, annual boostering is likely to be needed. It has been brought to our attention that some breeders are not boostering and yet are advertizing stallions as “EVA negative and vaccinated”. If antibody levels are not adequately elevated (by boostering), the animal may still become infected and a shedder. They need to be “EVA negative and vaccinated annually”!
Equine Viral Arteritis – Summary

EVA is not a disease to be panicked about!

EVA prevention does require management, but it is not difficult to achieve.

Vaccination of susceptible animals would go a long way to preventing or assisting in controlling outbreaks.

Better Federal importation restrictions and monitoring would be beneficial for the industry.
Equine Viral Arteritis – Thanks

We would like to extend particular thanks, and that of the industry, to Dr. Peter Timoney of the University of Kentucky Gluck Institute (USA) for his myriad of EVA research and publications, as well as his kind provision of photographs and other material for use in this presentation.
Equine Viral Arteritis – Sources

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